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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,834	12/05/2003	Gary R. Holt	10006.001710	8546

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EXAMINER	
WERNER, DAVID N	
ART UNIT	PAPER NUMBER
2621	
MAIL DATE	DELIVERY MODE
07/18/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/729,834	HOLT ET AL.	
	Examiner	Art Unit	
	David N. Werner	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-6 and 8-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-6 and 8-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 July 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office action for US Patent Application 10/729,834 is responsive to communications filed 14 April 2008, in reply to the Non-Final Rejection of 18 January 2008. Currently, claims 2-6 and 8-12 are pending.

2. In the previous Office action, claims 2-4, 6, and 8-11 were rejected under 35 U.S.C. 103(a) as obvious over "Motion Compensated Enhancement of Noisy Image Sequences" (Kalivas et al.) in view of International Publication 00/64167 A1 (Prakash et al.). Claims 5 and 12 were rejected under 35 U.S.C. 103(a) as obvious over Kalivas et al. in view of Prakash, and in further view of US Patent 5,544,239 A (Golin et al.).

Response to Arguments

3. Applicant's arguments filed 14 April 2008 have been fully considered but they are not persuasive. Applicant argues that Prakash et al. does not teach the claimed limitation of "reducing impact of color blur from said segments that are no longer adjacent". Figure 16 of Prakash is used to illustrate newly-exposed regions. However, if a newly-exposed region is created, it inherently separates two formerly-adjacent regions that are now no longer adjacent. In the example of figure 16 of Prakash et al., the rear of the van and the portion of a background previously coded are no longer adjacent, since they are separated by region 1601. A further illustration may help show this more clearly. In figure 1A, two adjacent regions A and B are moving apart over background Z along their respective vectors. In figure 1B, region C is a newly-exposed

region that separates regions A and B. Regions A and B are no longer adjacent. Therefore, it is respectfully submitted that in Prakash et al., whenever a new region is exposed, the new region inherently separates two previously-adjacent regions, no longer adjacent. The prior art rejections based on Prakash et al. are maintained.

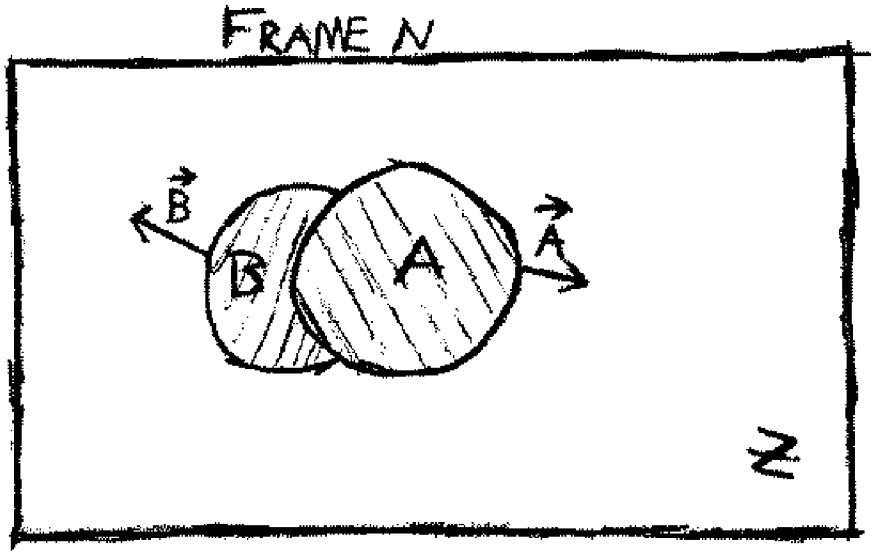

Figure 1A

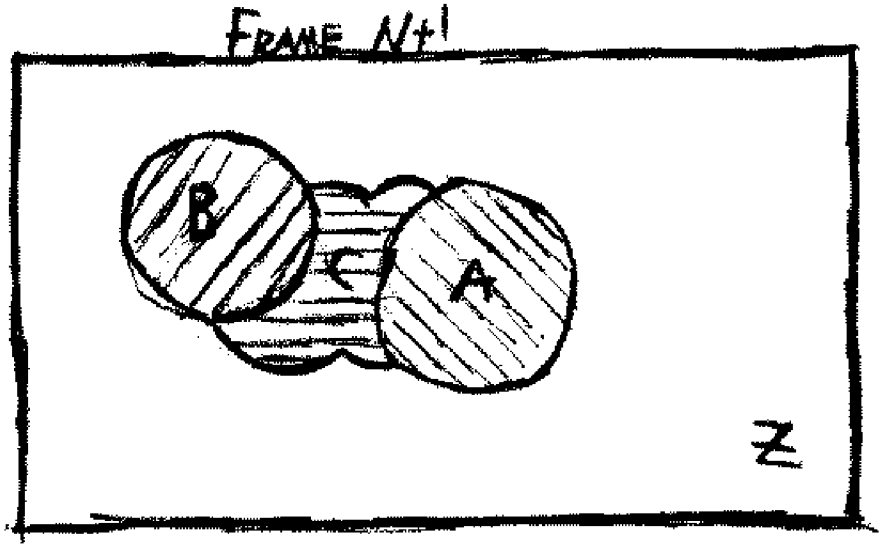

Figure 1B

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2-4, 6, and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Motion Compensated Enhancement of Noisy Image Sequences" (Kalivas et al.) in view of International Publication 00/64167 A1 (Prakash et al.), admitted as prior art in page 7: line 34–page 8: line 12 of the specification of the present invention, and cited in the Information Disclosure Statement of 18 June 2004. Kalivas et al. teaches a noise compensation algorithm that reduces the effect of motion blur. Regarding claims 2, 6, and 8, equation 15 of Kalivas et al. gives motion compensated spatiotemporal filter, and equation 16 gives a spatiotemporal mean filter. Regarding the "object motion estimation for arbitrarily shaped segments" to align pixels, between a frame at time k and at time k+1, the motion of an object pixel is given according to a linear model (§ 2.2). A frame is segmented according to object indicator function λ, where for a given pixel (i, j) at frame k, λ(i, j, k) is set to 1 if the pixel is in the object, and 0 if not (§ 2.1). Then, object indicator function λ serves as a weighting function. The segmentation model can be modified for multiple objects (equation 3). Regarding the "weighted average", in the spatiotemporal mean filter, the average of pixel values g(l, m, n) is then taken over region L in space-time window (Wni, Wnj, T), centered on point (in, jn) at time k. L is only counted in the region in which for a certain object, λ(l, m, n) is

defined (§ 4.2). This reduces the blur between the boundaries of the various objects (abstract). However, Kalivas et al. does not take into account boundary regions.

Prakash et al. teaches a video motion encoder and decoder. Figure 2 shows the method performed by the encoder, and figure 4 shows the method performed by the decoder. Regarding claims 2, 6, and 8, in the encoder of Prakash et al., at step 204, block 104 segments an image into various regions from a method known in the art (pg. 8: lines 27-32). At step 206, block 106 receives a second image frame, and at step 207, the second image is segmented (column 9: lines 7-13). At step 208, block 108 encodes the motion between the two images (column 9: lines 14-15). This corresponds with the claimed "object motion estimation". At step 209, as determined from the motion from step 208, newly-exposed regions are discovered (column 9: lines 16-18) and encoded. Since these newly-exposed regions inherently separate previously-adjacent regions, this corresponds with the claimed "determining segments that are no longer adjacent to a segment boundary based on said motion estimation", since determining newly-exposed regions is performed by determining a difference in segmentation between the two frames (pg. 14: lines 30-34) and determining the predicted image with the actual image at the new regions (pg. 19: lines 7-25), thus determining the difference from new segments and previous segments, near the boundaries of the segments (column 23: lines 28-32). This appears substantially similar to the determination of pixels "no longer immediately adjacent" to a boundary segment in the present invention from determining exposed areas (specification: pg. 8: lines 17-25; pg. 13: line 23).

Kalivas et al. teaches a majority of the claimed invention except for determining newly-exposed regions according to changed segmentation of an image. Prakash et al. teaches that it was known at the time of the invention to calculate exposed regions of an image, and perform special coding on the exposed regions. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the filter of Kalivas et al. to decrease the weight of exposed regions of an image, as taught by Prakash et al., since Prakash et al. states in page 4: lines 14-17 that such a modification would reduce noise produced from residue between frames.

Regarding claim 3, in Kalivas et al., in any exposed area in a given frame, that is, an area outside an object, weight λ is zero (§ 2.1), and so will not be counted in a temporal filter (§ 4.1).

Regarding claims 4 and 11, Kalivas et al. and Prakash et al. are silent regarding Group of Picture (GOP) structure. However, the examiner takes Official Notice that the limitation of "determining additional motion information across GOP boundaries" is a well-known part of the MPEG standard. A GOP for which motion estimation can be taken across GOP boundaries is well-known in the art as an "open GOP". It would have been obvious for one having ordinary skill in the art at the time the invention was made to include a filter on a video stream having open GOPs, since open GOPs allow for reduced bandwidth in an encoded image sequence.

Regarding claims 9 and 10, Prakash et al. determines residue areas of an image both from “background residue” (pg. 19: lines 16-29; pg. 19: lines 8-24), corresponding with the "blur region near an exposed area" in claim 9, as well as from “local residue”

from other discrepancies in segment matching (pg. 9: line 30–pg. 11: line 8; pg. 19: line 27–pg. 20: line 10), which encompasses the claimed "blur region between converging objects" in claim 10.

6. Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kalivas et al. in view of Prakash et al. as applied to claims 1 and 8 above, and further in view of US Patent 5,544,239 A (Golin et al.). The above-cited art do not teach adjusting a temporal filter based on a lighting offset.

Golin et al. teaches a motion estimation method that compensates for a fading image. Regarding claims 5 and 12, Figure 1 of Golin et al. shows brightness adjustment unit 104, which calculates base image 106 by reducing pixels in an image by the average pixel brightness in the image and in the next image (column 2: lines 43-53). This is in response to fade detector 101, which stores the frame in a buffer if a sequence is fading (column 2: lines 25-42). Motion analysis unit 108 then determines displacement vectors between the current image and the previous base image (column 3: lines 16-15).

Kalivas, in combination with Prakash, discloses the claimed invention except for calculating a lighting offset. Golin et al. teaches that it was known to calculate motion analysis in an image sequence based on images with adjusted brightness. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to add a brightness adjustment unit to a motion analysis system as taught by

Golin et al., since Golin et al. states in column 1, lines 41-55 that such a modification would increase accuracy of motion estimation.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571)272-9662. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri, can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. N. W./
Examiner, Art Unit 2621

/Mehrdad Dastouri/
Supervisory Patent Examiner, Art Unit 2621